**Unit Two: Newton’s Three Laws**

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| **Stage One:** *Science Big Ideas* | *What are the science big ideas that are essential for this unit?*  **Aim:**   1. Forces (ICC) 2. Newton’s Laws (ICC)    1. Objects change their motion only when a net force is applied. Laws of motion are used to calculate precisely the effects of forces on the motion of objects. The magnitude of the change in motion can be calculated using the relationship F = ma, which is independent of the nature of the force. Whenever one object exerts force on another, a force equal in magnitude and opposite in direction is exerted on the first object.   **Essential Questions:**   1. How can Newton's Three Laws be applied to the natural world? 2. How does our understanding of Newton Laws affect the way we live? |
| **Stage Two:** *Content, Skills & Assessment* | |  |  |  | | --- | --- | --- | | **Content** | **Skills** | **Assessment** | | 1. *Friction* 2. *Net Force* 3. *Balanced Force* 4. *Unbalanced Force* | * Define friction using guided tri-fold notes and MIMIO * Define net force using guided tri-fold notes and MIMIO * Define balanced force using guided tri-fold notes and MIMIO * Define unbalanced force using guided tri-fold notes and MIMIO | 1. Unit Two Test 2. CSR | | 1. *Inertia* 2. *An object in motion/rest will remain in motion/rest unless acted upon by an outside unequal force* | 1. Define Newton's First Law using tri-fold notes and MIMIO 2. Analyze Newton's First Law in a school bus crash using differentiated reading guides and "Name it, Verb it, Big Picture" strategy 3. Debate seat belts in school buses using knowledge from reading guides, Scott Grabe email, round table discussion and collaborative groups (21st) 4. Evaluate Newton's First Law in their everyday life with the use of YouTube videos, graphic organizers, and a think aloud (21st) 5. Examine their own lives for Newton's First Law with the use of graphic organizers (21st) 6. Communicate their findings of Newton's First Law with the use of a threaded discussion on wordpress.com (21st) 7. Role-play Newton's First Law by acting through a play created in collaborative groups (21st) 8. Critique the Olympics luge course using their knowledge of Newton's First Law and a formal test | 1. Unit Two Test 2. Seat Belt Debate | | 1. *F = ma* 2. *Unit of Newton* | 1. Define Newton's Second Law using tri-fold notes and MIMIO 2. Apply their knowledge of Newton's Second Law to the "All-American Egg Drop" with the use of wallwisher (21st) 3. Create a device to protect an egg that will drop from the ceiling using only five sheets of paper and 1 meter of tape and their knowledge of Newton's Laws (21st) 4. Communicate their thought process through the creation of the device by video taping themselves during the design and revision process (21st) 5. Evaluate their classmates thought process by watching the reflections and a guided reflection prompt (21st) 6. Evaluate Newton's Second Law in their everyday life with the use of YouTube videos, graphic organizers, and a think aloud (21st) 7. Examine their own lives for Newton's Second Law with the use of graphic organizers (21st) 8. Communicate their findings of Newton's Second Law with the use of a threaded discussion on wordpress.com (21st) 9. Role-play Newton's Second Law by acting in a play created in collaborative groups (21st) 10. Critique the Olympics luge course using their knowledge of Newton's First Law and a formal test. | 1. Unit Two Test 2. Egg Drop Formal Lab 3. CSR | | 1. *Action/Reaction* 2. *Momentum* | 1. Define Newton's Third Law using tri-fold notes and MIMIO 2. Evaluate the realism of Newton's Third Law in Mario Kart Wii by playing the game and answering prompt questions 3. Evaluate Newton's Third Law in their everyday life with the use of YouTube videos, graphic organizers, and a think aloud (21st) 4. Examine their own lives for Newton's Third Law with the use of graphic organizers (21st) 5. Communicate their findings of Newton's Third Law with the use of a threaded discussion on wordpress.com (21st) 6. Role-play Newton's Third Law by acting through a play created in collaborative groups (21st) 7. Critique the Olympics luge course using their knowledge of Newton's Third Law and a formal test. | 1. Unit Two Test 2. CSR | |
| **Stage Three:** *Learning Experiences* | *Engagement of Students:*   1. Student Debate    1. Students will use their knowledge of Newton’s First Law and debate the use of seatbelts on school buses 2. Egg Drop Lab and Video Reflections    1. Students will construct a device to prevent damage to an egg by dropping it from the ceiling.    2. Students will reflect on their own learning by communicating their thought process throughout the egg drop lab and construction of the device 3. Mario Kart Wii    1. Students will evaluate the realism of Newton’s Laws by playing Mario Kart Wii 4. YouTube Clips    1. Students will describe, analyze, and evaluate Newton’s Three Laws using YouTube 5. Blog Posts    1. Students will communicate their findings through a threaded discussion on wordpress    2. Students will collaborate on their own learning of Newton’s Laws with the threaded discussion 6. Peer Revisions    1. Students will revise and evaluate the writing of their peers by using Google docs, district rubric, and highlighting techniques   *Research Based Strategies Used:*   1. Pair-Share 2. Tri-fold Notes 3. Highlighting Techniques 4. Constructed Short Responses 5. Think Alouds 6. Graphic Organizers 7. Write Tools 8. Varied Responses   *Differentiation/Instructional Strategies Used:*   1. Tri-fold Notes for visual and artistic learners 2. Number Notes for auditory and visual learners 3. Threaded Discussion for social-individual learners 4. Cooperative Groups for social-group learners 5. Role Playing kinesthetic learners 6. Egg Drop Lab kinesthetic 7. Class Debate for social learners 8. YouTube Clips for visual learners 9. Guided Graphic Organizers for IEP students with writing accommodations 10. Accommodated test for IEP students   *Review from Previous Units:*   1. Unit 1: Speed and Acceleration   *Preview to Next Units:*   1. Unit 3: Describing Forces 2. Unit 4: Energy, Work, and Power   *Life and 21st Century Skills Learned:*   1. Use of technology to communicate ideas to other students 2. Demonstration of creative and original thought 3. Working in cooperative groups towards a common goal 4. Effectively communicating ideas and thoughts through writing and drawing 5. Presenting ideas and thought in front of a group of peers |